

PROJECT NUMBER: 1704
PROJECT TITLE: Supercritical Fluid Processes
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I. LOW NICOTINE

A. Objective: Provide product support for Flavor Development and for Cigarette Testing.

B. Results: Bright, burley, and oriental tobacco components and two special strip blends were extracted individually at the standard Bremen IV control conditions. An extraction run using washed Japanese burley stems as scrubber was also made. The resulting extracted blends were given to Flavor Development for subjective evaluation. The bright, burley, and oriental components gave extraction efficiencies of 85%, 95%, and 76%, respectively. Burley extraction efficiency was reduced to 86% when run at 31% OV in lieu of the standard 25% OV.

An extraction of Full Flavor Blend, which included sheet material made from Bremen IV spent scrubber stems, resulted in a nicotine reduction of 77% as compared to 92% for a control run. Residual monopotassium citrate in the sheet material appears to inhibit nicotine extraction from the blend. The extracted blend has been forwarded to Cigarette Testing.

C. Plans: Continue support as requested.

II. LOW NICOTINE

A. Objective: Optimize stem usage as an adsorber.

B. Results: Increasing the OV of BL burley stems from 35% to 41% was observed to dramatically alter the nicotine profile throughout the adsorber bed. Stems at 41% OV gave a nicotine profile which was a significant shift from the bottom of the bed to the head of the scrubber. Normally, the bottom layer of stems contains ca. 1.2% nicotine. The higher OV stems bottom layer contained ca. 0.7% nicotine. In addition, a run using unwashed bright stem at 41% OV gave an extraction efficiency of 95%. Control 35% OV unwashed bright stems give only 85% reduction. This implies that raising the stem OV may reduce stem requirements. Three extraction runs using bright WFSS at 25%, 35%, and 45% OV in a single vessel scrubber design were made to further evaluate the nicotine profile throughout the scrubber bed. Results are pending.

The use of a dynamic OV profile in the stems was proposed and tried. A run using half the standard stem amount in a combination of 46% OV BL burley stems at the top and 23% OV BL burley stems at the bottom of the scrubber resulted in a 90% nicotine extraction

efficiency. Further work will include how the high OV of the stems affects the tobacco OV during extraction.

C. Plans: This work is ongoing.

III. LOW NICOTINE

A. Objective: Evaluation of alternate extraction conditions.

B. Results: A low pressure extraction run was made at 2400 psia and 62 °C. These conditions were chosen in order to be outside the region in which the spinodal line could be reached if an uncontrolled depressurization of CO₂ took place. A CO₂-to-tobacco ratio of 250 : 1 was required to obtain 97% nicotine reduction. The tobacco was submitted for subjective evaluation.

C. Plans: No further work is planned.

IV. LOW NICOTINE

A. Objective: Provide technical support for the ART Facility Group.

B. Results: Tobacco waxes were recovered from a Bremen IV let-down extract. The solid waxes were found to have a density of 0.92 g/cc and a wide melting range of from 54 °C to 80 °C. An excess amount of the waxes was placed in the microextractor system, and their solubility in liquid CO₂ was measured to be as follows:

<u>CONDITIONS</u>	<u>CONC. ppm</u>
11 °C @ 900 psi	421
11 °C @ 1500 psi	513
11 °C @ 3000 psi	850
19 °C @ 900 psi	514

This information was forwarded to the ART Facility Group for use in system design.

C. Plans: Work is ongoing as requested.

V. LOW NICOTINE

A. Objective: Relocate the 7th floor lab to D201.

B. Results: Modifications to the D201 laboratory have begun and are expected to be complete in another month.

C. Plans: Design and fabricate a new one liter extractor system in D201 prior to shutting down the 7th floor lab and relocating.